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**WHY THE RONGELAP REASSESSMENT PROJECT  
DID NOT FULFILL ITS MISSION**

**RONGELAP VERSUS ENIWETAK AND BIKINI: EQUAL TREATMENT?**

**a report to the Rongelap Atoll Local Government**

**Bernd Franke**

**May 1990**

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*John Rudolph's File*

## WHY THE RONGELAP REASSESSMENT PROJECT DID NOT FULFILL ITS MISSION

The Rongelap Reassessment Project chaired by Dr. Kohn did not answer the two questions mandated in the Compact: Was the data in the DOE-1982 report<sup>1</sup> adequate? Were the conclusions correct? *In my opinion, both questions have to be answered in the negative for three reasons: (1) the failure of the DOE-1982 report to provide an assessment of the radiation doses if only local food would be consumed by the Rongelap community, (2) the confusion about the maps on pages 8 and 9 of the report, and (3) the failure of the DOE-1982 report to address troublesome levels of plutonium found in urine of Rongelap people. (4) In addition, Dr. Kohn prematurely declared the plutonium issue to be resolved.*

(1) In his report<sup>2</sup>, Dr. Kohn failed to present radiation dose estimates for the case that all or some of Rongelap people have to rely on "local food only", although he criticized that DOE-1982 incorrectly labeled doses resulting from a mixed food diet as from a "local food only" diet. This fact represents a severe omission in the DOE-1982 report. Such an assessment is needed to make an informed decision about the resettlement options for Rongelap Atoll.

*Consequence: In the case of a "local food only" diet, radiation doses would be clearly above the limit established in the 1960 Federal Guide of 5 rem over 30 year<sup>3</sup>. The 1982 report failed to provide the statement that doses below the legal limit can only be ensured if a certain amount of mixed food is part of the diet. Dr. Kohn failed to address the need to clearly define what a mixed food diet consists of and which amounts and types of local food would lead to excessive doses and should therefore be avoided.*

(2) In his report, Dr. Kohn failed to address the confusion which was generated in the Rongelap community about the map on pages 8 and 9 of the DOE-1982 report. That very map was one of the baselines for the Rongelap community in comparing the contamination levels on Rongelap Atoll with levels on Eniwetak and Bikini Atolls and ultimately prompted Rongelap's decision to leave their atoll.

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- 1 U.S. Department of Energy (1982). The Meaning of Radiation for Those Atolls in the Northern Marshall Islands That Were Surveyed in 1978. DOE/NBM-1052
  - 2 Kohn H.L. (1989) Rongelap Reassessment Project Report (Corrected Edition), Berkeley CA, March 1, 1989
  - 3 The 30 year whole body dose [1978-2008] from "local food only" would have been 6.3 rem rather than the 2.5 rem reported in the 1982 bilingual report. Accounting for radioactive decay, doses from 1990-2020 would be 5.3 rem/30 yr. (see also: Statement of Bernd Franke before the Subcommittee on Insular and International Affairs, House Interior and Insular Affairs Committee, House of Representatives, United States Congress, November 16, 1989, Washington, D.C.).

*Consequence: Dr. Kohn did not address one of the key issues in the discussion about the habitability of the atoll. He did not evaluate whether the data presented on pages 8 and 9 was adequate.*

(3) In his report, Dr. Kohn failed to address the question of plutonium in urine in the context of the DOE-1982 report. The mandate of the review was to investigate whether the data was adequate. Clearly, the data on which the DOE-1982 report relied on was inadequate, since the troublesome high readings of plutonium in urine of Rongelap residents were ignored<sup>4</sup>. At the very least, the DOE-1982 report should have addressed the existence of the data, should have addressed the uncertainties associated with it and define the course of action the DOE planned to take to resolve the problem.

*Consequence: Dr. Kohn failed to declare that the data was inadequate and that DOE should have stated that the high levels of plutonium in urine were found, the reason for which was (at the time of the 1982 report) unresolved.*

(4) In his report, Dr. Kohn failed to correctly present the status of the plutonium problem at the time of his final report. By using the Moss excretion function, which was not peer reviewed, he determined a dose below the Federal guide although using the Durbin excretion functions, the use of which is officially recommended by the ICRP, doses would have been 6 rem over 30 years and above the Federal Guide. (Since Kohn's report was published, results of new urine samples taken on Mejjatto Island became available suggesting lower levels than at the time of Kohn's final report since old samples appeared to be contaminated with dust. This new data, however, is a different issue which was not known at the time of Dr. Kohn's report, at which time he considered Rongelap safe for habitation for adults despite the high earlier readings.)

*Consequence: Dr. Kohn prematurely declared that levels of plutonium in urine did not preclude resettlement of Rongelap Island.*

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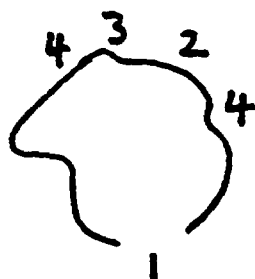
<sup>4</sup> Franke B. (1989), Is Rongelap Atoll Safe?, March 3, 1989, Institute for Energy and Environmental Research, Takoma Park, MD

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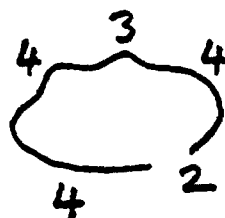
## RONGELAP VERSUS ENIWETAK: EQUAL TREATMENT?

One of the main reasons of the Rongelap community to leave their island was the comparison of contamination levels at Rongelap atoll with those on Bikini and Eniwetak (see Figure 1).

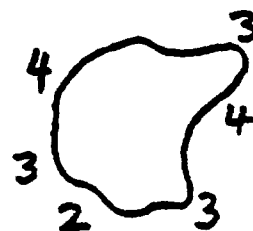
**Figure 1:** Map with levels of radioactive contamination on Rongelap, Eniwetak and Bikini atolls (after DOE-1982)  
*(the DOE-1982 report explains the numbers as follows:*  
 1 the least amount of radioactive atoms  
 2 a small amount of radioactive atoms  
 3 a larger amount of radioactive atoms  
 4 the largest amount of radioactive atoms)<sup>5</sup>



**ENIWETAK**



**BIKINI**



**RONGELAP**

One of the major concerns of the Rongelap people was the fact that Bikini and Eniwetak atolls were apparently not habitable since major decontamination efforts had to take place in order to make those atolls habitable. Islands in Eniwetak atoll were assigned the code numbers 1,2,3,4,4, islands on Bikini atoll the code numbers 2,3,4,4,4

<sup>5</sup> According to Dr. Bair from Battelle Pacific Northwest Laboratories, the code numbers represent levels of cesium-137 and plutonium-239/240 in the top 5 cm of soil (dry weight) in the following way:  
 code number 4: > 100 pCi/g Cs+Sr and/or > 50 pCi/g  
 code number 3: 20-100 pCi/g Cs+Sr and/or 15-50 pCi/g  
 code number 2: 2-20 pCi/g Cs+Sr and/or 1-15 pCi/g  
 code number 1: < 1 pCi/g Cs+Sr and/or < 1 pCi/g  
 [letter W.J. Bair to B. Franke, July 14, 1989]

and on Rongelap atoll the code numbers 2,3,3,3,4,4. There was apparently little confidence for the recommendation that the Rongelap people should stay where they were (on Rongelap island).

The original concern of the Rongelap people raises an important question: what are the differences in radiological conditions and in the dose assessments for Rongelap, Eniwetak and also Bikini atolls. What was the data and which steps were taken as a consequence of the pre-cleanup surveys?

Table 1 provides a comparison of major radiological conditions on Rongelap and Eniwetak atolls. Figure 2 compares the data on plutonium contamination on the various islands of Rongelap, Eniwetak and Bikini atolls. Table 2 reports the data which was used to prepare Figure 2.

In 1973, the Eniwetak dose assessment concluded that radiation doses would be around 1 rem/30 years if the Eniwetak people reside on Eniwetak island in the southern part of the atoll. Residence on Enjebi island in the northern part of the atoll which was heavily affected from the bomb fallout would have resulted in radiation exposures of 6 rem/30 years and thus above the 1960 Federal Guide of 5 rem/30 years.

Despite the fact that residence on Eniwetak island would not have resulted in exposures above the legal guide, a sophisticated survey and cleanup program was established by the Defense Nuclear Agency (DNA) in collaboration with other government agencies (ERDA, EPA). There were several major reasons for this:

- the wish of the Eniwetak people for a "complete cleanup", including Enjebi island;
- the concern about high levels of plutonium in soil on the northern islands of the atoll; and
- a cleanup guide of 250 mrem/yr and 4 rem/30 yr which was more stringent than the standard of 500 mrem/yr and 5 rem/30 yr applied to Rongelap atoll.

The final criteria for plutonium decontamination on Eniwetak atoll distinguished between 3 conditions:<sup>6</sup>

**Condition A** clean all 0.5 hectare areas on food gathering islands that exceed 160 pCi/g

**Condition B** clean all 0.5 hectare areas on agricultural islands that exceed 80 pCi/g

**Condition C** clean all 0.5 hectare areas on village islands that exceed 40 pCi/g

According to the Eniwetak Radiological Support Project Final Report, the doses which are associated with the plutonium levels are less than 1% of the Federal Guide<sup>7,8</sup>.

6 Eniwetak Radiological Support Project (1982), Final Report, U.S. Department of Energy. NVO-213, page 64

7 Dose predictions provided in NVO-213 (page 61) assign an annual lung dose of 0.01 rem as a result of a plutonium soil concentration of 40 pCi/g. Whole body doses are even lower.

Despite the fact that a plutonium cleanup was unnecessary would one use the Federal Guide as a measuring stick, a cleanup program for plutonium contamination was initiated and accomplished. In the course of this program, all 40 islands of Eniwetak atoll were sampled for plutonium and other transuranics. Six islands were candidates for plutonium decontamination, even islands which would only be occasionally visited by the Eniwetak people. Considerable emphasis was given to the decontamination of Enjebi island, the homeland of the dri-Enjebi population. About 80,000 cubic meters of contaminated soil with a total transuranic activity of 15 curies was dumped into a bomb crater on Runit island and covered with concrete. This represents only a fraction of the transuranic activity which is still present on the soils of the atoll.

How does this compare to the Rongelap situation? The Rongelap population was told in the DOE-1982 report that their radiation exposures would be 2.5 rem/30 yr; more than twice than what was estimated for future residents on Eniwetak island without cleanup of the atoll. (In both cases, a mixed food diet was assumed for the dose calculations -- the issue of local food only was addressed in neither case). The average concentration of plutonium in the top 15 cm of soil of Rongelap island is more than twice the amount found on Eniwetak island.

The data on radiological conditions of Rongelap atoll is far less comprehensive than that available for Eniwetak: in the 1978 survey of the Northern Marshall Islands, only 8 out of 48 islands on Rongelap atoll were sampled. Based on the available data for each atoll, the atoll average plutonium concentration is about the same for Eniwetak and Rongelap<sup>9</sup>. The distribution, however, is different. Whereas the southern part of Eniwetak atoll shows relatively low levels of plutonium<sup>10</sup>, the northern part of the atoll is heavily contaminated (see Figure 2). The difference between the islands is not as striking on Rongelap atoll. In interpreting the absolute numbers in Figure 2, one should bear in mind that the data which is reported here represents the island averages. Plutonium is unevenly distributed on the islands, thus the maximum concentration of plutonium on each island based on multiple soil samples can be ten times the average. The larger the number of samples, the more likely it is that areas with high levels of contamination will be found. Thus, one should not compare the average levels on each island with the cleanup guideline based on a small portion of the island. Such a comparison can only be made after a complete survey.

According to the DOE report on Eniwetak, there was no dose-related need to conduct the plutonium cleanup. Restrictions of food gathering could have been put into place and some islands could have been declared off-limits. Why then were the people of Eniwetak not told that they should go back to Eniwetak island where doses would be

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8 For comparison: the ongoing cleanup operations for plutonium on Johnston Atoll are based on a standard which is about 5 times more stringent than the one used for Eniwetak Atoll.

9 In the case of Eniwetak (and also Bikini) an area weighted average was used for the atoll. For Rongelap, the atoll average was derived by averaging the eight island averages.

10 One should bear in mind that levels on these southern islands are still about 10 times larger compared with levels from the Continental United States,

below the Federal Guide and why wasn't it concluded that only non-radioactive cleanup and resettlement work was necessary? That should have cut the cost of the rehabilitation program significantly.

The Rongelap situation is similar to the one of Eniwetak in 1973. The difference is, that at this time, the people in question are asked to return without a complete survey of their atoll and the analysis of needs and methods for a radiological cleanup which includes the plutonium contamination of the atoll. Such an option was provided to the Eniwetak people. One should bear in mind that the Eniwetak people were not exposed like the 81 Rongelap people who received an acute dose of about 190 rem in 1954 and a chronic dose of about 4 rem after the 1957 resettlement to their atoll.

One short comment should be made to the Bikini situation. One island (Nam) has the highest contamination with plutonium from all islands in the three atolls. Nam was the site for the Bravo shot which caused most of the contamination of Rongelap atoll. Due to that fact, the atoll average plutonium levels are higher than on Rongelap and Eniwetak. The plutonium contamination on Bikini without Nam island is about the same as on Rongelap atoll. Soil data for plutonium is less complete than for Eniwetak: data is reported for 14 out of 23 islands<sup>11</sup>. The plutonium contamination on Eneu, the current candidate residence island, is about half the level on Rongelap island. According to a 1977 report by Lawrence Livermore Laboratory, the radiation dose from living on Eneu island would be 4.2 rem/30 yr<sup>12</sup>. (The 1977 Bikini report was prepared at a time when the Bikini people experienced high levels of cesium-137 in their bodies and alarming levels plutonium-239/240 were found in their urine. They were moved off Bikini island and Eneu became the candidate for a future village.) Notwithstanding the fact that the 1977 Bikini report showed that the 30 year whole body doses would be below the Federal Guide if people reside on Eneu, a cleanup program was subsequently implemented.

To sum up: the radiation doses estimated by the DOE for residence of the Eniwetak people on Eniwetak island and for the Bikini people on Eneu island did not exceed in either case the 1960 Federal Guide. The Eniwetak people were not asked to move to Eniwetak; nor were the Bikini people asked to move to Eneu without further surveys and cleanup. In both cases, this should not have posed a radiological problem, at least if the DOE dose assessment is assumed to be correct. Comprehensive survey and cleanup operations were put into place for Eniwetak and, to a lesser degree, for Bikini atoll. In contrast to this, the Rongelap people were and are asked to return to Rongelap without a comprehensive survey and cleanup of their atoll.

Would Rongelap need a cleanup if the same standards would be applied as were used for Eniwetak or Bikini? It appears that the northern islands of Rongelap atoll have

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11 The data on soil levels from: Robison W.L., Conrado C.L., Stuart M.L. (1988). Radionuclide Conditions at Bikini Atoll. UCRL-53840

12 Robison W.L., Phillips W.A., Colsher C.S. (1977). Dose Assessment at Bikini Atoll, UCRL-51879 Pt. 5

levels of plutonium contamination which are comparable to some of the islands which were cleaned up on Eniwetak. The extent of the contamination and the most favorable cleanup measures can only be evaluated after a complete survey of all islands has been conducted.

One should also bear in mind that the 1960 Federal Guide may soon become obsolete as more stringent standards (such as 3 rem/30 yr) are in preparation. Also, the plutonium cleanup on Johnston Atoll is based on an even more stringent standard as in the case of Eniwetak and may be considered for the Marshall Islands as well.



**Table 1:** Comparison of major radiological conditions on Rongelap and Eniwetak atolls

*(Source of dose assessment and radiological data:*

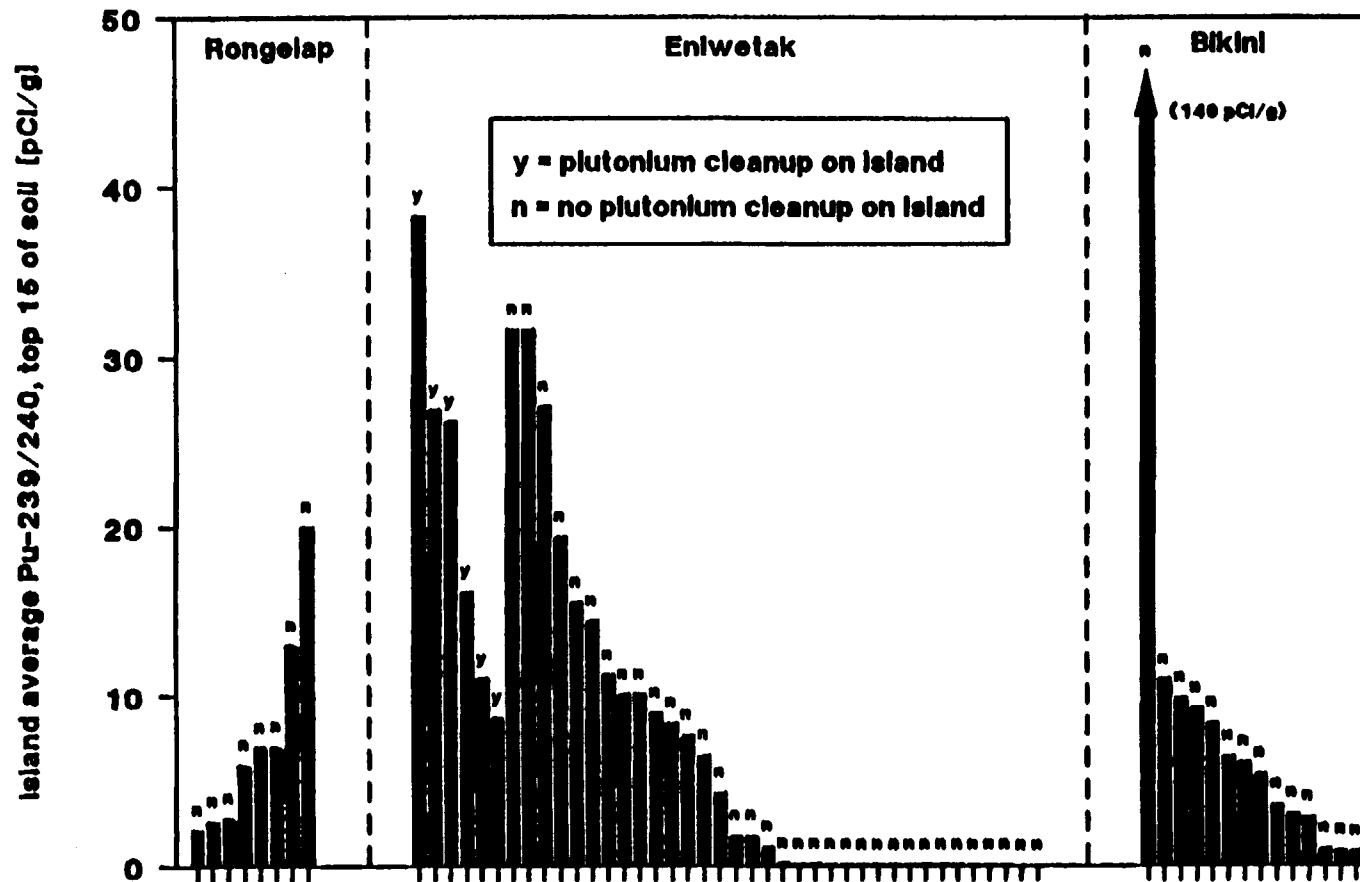
*Eniwetak: Eniwetak Radiological Support Project (1982), Final Report, U.S. Department of Energy. Nevada Operations Office. NVO-213*

*Rongelap: Robison et al. (1982), The Northern Marshalls Radiological Survey: Terrestrial Food Chain and Total Doses, UCRL-52853 Pt.4)*

	Eniwetak atoll	Rongelap atoll
Islands considered as residence in dose assessment	Eniwetak Enjebi	Rongelap
Previous radiation exposure from nuclear testing	1945-1982: < 1 rem (?)	1954: 190 rem 1957-1985: 4 rem
Island off-limit for visitation	Runit	none
Calculated 30-year dose on least contaminated island considered for residence ( <i>no cleanup, mixed food diet</i> )	Eniwetak: 1 rem (local food from southern islands plus 40% coconuts from northern islands)	Rongelap: 2.5 rem (local food only from Rongelap Island)
Calculated 30-year dose on most contaminated island for which doses were calculated ( <i>no cleanup, mixed food diet</i> )	Enjebi: 6 rem	Naen: 12 rem
Dose limits applied in habitability assessment ( <i>whole body doses</i> )	250 mrem/yr and 4 rem/30 yr	500 mrem/yr and 5 rem/30 yr
Atoll average plutonium contamination [pCi/g] ( <i>top 15 cm of soil</i> )	8.0	7.5
Atoll land mass [km <sup>2</sup> ]	7	9
Pu contamination on residence island ( <i>pCi/g in top 15 cm</i> )	0.081 (Eniwetak)	2.1 (Rongelap)
Islands sampled for Pu	40 out of 40	8 out of 48
Number of Pu soil samples	947 samples	48 samples

\*) Coconuts from southern islands only (Jinedrol through Kidrenen)

**FIGURE 2: PLUTONIUM IN SOIL ON ISLANDS OF RONGELAP, ENIWETAK AND BIKINI ATOLLS**



Atoll	Rongelap	Eniwetak	Bikini
Atoll average Pu in soil	7.5 pCi/g	8.0 pCi/g	17 pCi/g
Land area in atoll	9 km <sup>2</sup>	7 km <sup>2</sup>	7.3 km <sup>2</sup>
Number of soil samples	48 samples	947 samples	590 samples
Islands sampled for Pu	8 out of 48	40 out of 40	14 out of 23
Pu on residence island	2.1 pCi/g	0.08 pCi/g	0.93 pCi/g

**Table 2:** Plutonium in the top 15 cm of soil of islands on Rongelap, Eniwetak and Bikini atolls  
The islands appear in the same order as in Figure 2.  
(Source of data: Rongelap -- UCRL-52853 Pt.4 [1982]; Eniwetak -- NVO-213 [1982]; Bikini -- UCRL-53840 [1988])

Island (Marshall name)	U.S. name	Area in km <sup>2</sup>	Island code	# of soil samples	Pu-239/40 top 15 cm [pCi/g] before cl.	Cleanup for plutonium?	Area of island cleaned (%)	Pu-239/40 top 15 cm [pCi/g] post cleanup
<b>Rongelap Atoll</b>		8 out of 48 islands sampled for plutonium						
Rongelap			F-42	18	2.1	no		
Eniwetak			F-33	6	2.6	no		
Borukka			F-49	3	2.8	no		
Yugui			F-5	1	5.9	no		
Kabell			F-13	5	7	no		
Melk			F-23	4	7	no		
Lomuilal			F-7	4	13	no		
Noen			F-1	7	20	no		
<b>Total</b>		<b>9.00</b>		<b>48</b>				
<b>Eniwetak Atoll</b>		40 out of 40 islands sampled for plutonium						
Lujar	Pearl	0.23		53	38.3	yes	44.1%	15.5
	Sally's Ch.	0.01		6	26.9	yes	n/a	12.1
Boken	Irene	0.18		58	26.2	yes	3.3%	29.5
Enjebi	Janet	1.18		139	16.2	yes	13.1%	10.1
Aamon	Sally	0.40		27	11	yes	4.5%	2.2
Runit	Yvonne	0.37		51	8.7	yes	13.5%	11.6
Louj	Daisy	0.09		20	31.6	no		
Kirunu	Clara	0.03		13	31.6	no		
Bokombako	Belle	0.12		36	27.1	no		
Bokinwatme	Edna	0.05		8	19.4	no		
Bokolua	Alice	0.09		23	15.6	no		
Eleleron	Ruby	0.02		5	14.5	no		
Mijkadrek	Kate	0.07		26	11.3	no		
Bokenelab	Mary	0.06		22	10.1	no		
Elle	Nancy	0.05		25	10.1	no		
Taiwel	Percy	0.01		6	9	no		
Aej	Olive	0.17		26	8.4	no		
Kidrinen	Lucy	0.08		28	7.7	no		
Bijire	Tilda	0.21		32	6.5	no		
Alembel	Vera	0.16		25	4.3	no		
Billa	Wilma	0.07		23	1.8	no		
Lojwa	Ursula	0.16		31	1.8	no		
Baken	Leroy	0.06		11	1.15	no		
Medren	Elmer	0.80		51	0.21	no		
Mut	Henry	0.16		15	0.14	no		
Boken	Irwin	0.12		8	0.13	no		
Kidrenen	Keith	0.10		13	0.11	no		
Ikuren	Glenn	0.17		28	0.11	no		
Inedrol	Uriah	0.02		8	0.09	no		
Anonij	Bruce	0.10		13	0.09	no		
Boko	Sam	0.00		5	0.09	no		
Eniwetak	Fred	1.30		24	0.08	no		
n/a	Van	0.03		6	0.08	no		
Ribewan	James	0.08		8	0.08	no		
Munjar	Tom	0.01		5	0.08	no		
Jihimi	Clyde	0.01		4	0.06	no		
Jinedrol	Alvin	0.01		5	0.06	no		
Japton	David	0.32		48	0.05	no		
Jedrol	Rex	0.02		7	0.04	no		
Bokandretok	Walt	0.00		5	0.04	no		
<b>Total</b>		<b>7.06</b>		<b>947</b>				

Table 2 (cont'd): Plutonium in the top 15 cm of soil of islands on Rongelap, Eniwetak and Bikini atolls

Island (Marshall name)	U.S. name	Area in km <sup>2</sup>	Island code	# of soil samples	Pu-239/40 top 15 cm [pCi/g] before cl	Cleanup for plutonium?	Area of island cleaned (%)	Pu-239/40 top 15 cm [pCi/g] post cleanup
<b>Bikini Atoll</b>								
14 out of 23 islands sampled for plutonium								
Nam	Charlie	0.54	B-1	33	140	no		
Lomäök	Fox	0.22	B-4	16	11	no		
Bikini	Haw	2.41	B-6	180	9.9	no		
Jelele	William	0.17	B-19	2	9.3	no		
Lukoj	Vitor	0.14	B-18	3	8.4	no		
Irioj	Dog	0.2	B-2	10	6.4	no		
Odrök	Easy	0.04	B-3	5	6.1	no		
Enidrik	Uncle	0.96	B-17	31	5.4	no		
Aamen	George	0.17	B-5	9	3.6	no		
Eneman	Tare	0.1	B-16	6	3.1	no		
Rojkere	Love	0.08	B-10	3	2.9	no		
Aerokojöl	Oboe	0.41	B-13	12	1	no		
Eneu	Nan	1.22	B-12	276	0.93	no		
Lele	Sugar	0.23	B-15	4	0.88	no		
Bokantauk	Item	0.09	B-7	0		no		
Iomelen	Jig	0.03	B-8	0		no		
Enaelo	King	0.02	B-9	0		no		
Eonjebi	Mike	0.03	B-11	0		no		
Bikdrin	Roger	0.1	B-14	0		no		
Adrikan	Yoke	0.02	B-20	0		no		
Oraken	Zebra	0.05	B-21	0		no		
Bokaetaktak	Alpha	0.03	B-22	0		no		
Bokdrokul	Bravo	0.03	B-23	0		no		
<b>Total</b>		<b>7.29</b>		<b>590</b>				